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Lockable Container and Locking Mechanism for Same

Field of the Invention

10 This invention relates generally to locking mechanisms and lockable containers having such mechanisms.

Background of the Invention

15 Externally-stored waste containers such as front-load, rear-load, and roll-off waste containers are prone to being raided by trash pickers or "dumpster divers" seeking to find valuable items among the refuse. It is desirable to discourage this activity, as it tends to create a mess around the containers, may damage the containers, and compromises the security and confidentiality of the
20 materials being discarded. Some jurisdictions have proposed or enacted ordinances to make such activity illegal.

 Many waste containers are locked to discourage dumpster diving. Typically, a metal chain is attached to the container's lid and then secured to the
25 container with a padlock. However, handling the chain tends to be cumbersome and the padlock and chain are exposed and thus vulnerable to tampering. There have been proposals to locate a padlock within a container such that the padlock is not exposed to tampering. For example, US patent no. 4,290,281 (Knaack et al.) discloses a lock system for a container, such as a tool box or a
30 storage cabinet, which is locked by a padlock. A structure within the container mounts the padlock within the container with only a key insertion end of the padlock body exposed for access thereto. However, the specific structure as disclosed is relatively complex, making construction of containers having such

structure relatively expensive. Furthermore, such structure is integrated into the container in such a way that makes it difficult to retrofit to existing containers.

5 US patent no. 5,076,078 (Weger Jr.) discloses a padlock protecting system for use with a container having a movable closure. A shelf supports the padlock within the container such that only the key insertion end of the padlock is exposed for external access and a bracket having one or more depending legs is carried by the supporting shelf and captures the shackle of the padlock. A tang is associated with the movable closure and is positionable within the shackle to
10 capture the padlock thereby maintaining the closure in a closed position. Like the '281 patent, the padlock protecting system disclosed in Weger is relatively complex, and is integrated into the container in such a way that makes it difficult to retrofit to existing containers.

15 It is therefore desirable to provide a locking mechanism for a container, that is relatively simple, effective to keep the container lid in a closed position, and is resistant to tampering. It is further desirable to provide a locking mechanism that can be retrofitted to an existing container.

20 **Summary of the Invention**

According to one aspect of the invention, there is provided a lockable container comprising:

- 25 a) a receptacle comprising a base, a top with a main receptacle opening, and a side wall extending around and between the base and top and having a recess suitable to receive a padlock and having a locking mechanism aperture smaller than the padlock;
- b) at least one lid mountable to the receptacle and configured to cover
30 at least a portion of the receptacle opening when in a closed position; and,

c) a locking mechanism comprising a lock engagement member such as a lock arm attached to the lid such that when the lid is in the closed position, at least a portion of the lock engagement member extends through the locking mechanism aperture and into the recess, and is securable in place with the padlock located in the recess.

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The recess can be a receiving cup having a wall that defines a recess opening. In such case, the locking mechanism aperture is located on the receiving cup wall generally facing the receptacle opening. In particular, the receiving cup can comprise a plurality of walls including a top wall, in which case the locking mechanism aperture is located in the top wall. The top wall can taper downwardly inwards, which is particularly useful in preventing refuse from collecting on the top of the receiving cup. The receiving cup can further comprise a bottom wall that tapers upwardly inwards, which is particularly useful for preventing refuse from collecting on the bottom of the receiving cup when the container is inverted for emptying.

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According to another embodiment of the invention, there is provided a locking mechanism that can be in a kit form and can be installed onto a conventional container. Such a conventional container has a receptacle with a base, a top with a main receptacle opening, and a side wall extending around and between the base and top and having a padlock aperture, and a lid mountable to the receptacle and configured to cover at least a portion of the receptacle opening when in a closed position. The locking mechanism comprises a padlock receiving cup and a lock engagement member. The receiving cup has a cup wall defining a main padlock opening and a locking mechanism aperture in the cup wall; the receiving cup is mountable to the inside of the receptacle side wall with the padlock opening cooperating with the receptacle padlock aperture and the locking mechanism aperture generally facing the receptacle opening. The lock engagement member has

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an attachment end that is attachable to the bottom of the container lid such that when the lid is in the closed position and the padlock housing is mounted to the receptacle, at least a portion of the lock engagement member extends through the locking mechanism aperture and into the receiving cup, and is securable in place with a padlock located in the receiving cup.

Brief Description of Drawings

Figure 1 is a schematic perspective view of an embodiment of a lockable waste container, having a lid in an opened position and a locking mechanism in an unengaged position.

Figure 2 is a schematic perspective view of the waste container wherein the lid is closed and the locking mechanism is in an engaged position.

Figure 3 is a schematic front elevation view of the waste container with its lid closed and its locking mechanism in the engaged position.

Figure 4 is a schematic perspective view of a receiving cup of the locking mechanism.

Figure 5 is a sectioned schematic side view of a lock arm engaged with the receiving cup.

Figures 6(a) to (d) are schematic side and front elevation views of another embodiment of a lockable waste container, with the waste container shown in a opened position (Figures 6(a) and (b)) and in a closed position (Figures 6(c) and (d)).

Detailed Description of Embodiments of the Invention

Directional terms such as "top", "bottom", and "upwards" are used in the following description for the purpose of providing relative reference only, and are not intended to suggest any limitations on how any apparatus is to be positioned during use, or to be mounted in an assembly.

Referring to Figures 1-3 and according to a first embodiment of the invention, a lockable waste container 10 comprising a receptacle 12 and a lid 14 is also provided with a locking mechanism that when locked, secures the lid 14 in place over the receptacle 12 to prevent unauthorized access into the container 10. Alternatively, the locking mechanism can be provided as a kit that can be retrofitted onto existing conventional waste containers, such as front load or rear load waste containers. The locking mechanism comprises a receiving cup 22 and a lock arm 30.

The container receptacle 12 includes a rectangular base 17, four side walls 18 extending around and upwards from the base 17 to form an open-faced box. A lip 20 extends around the periphery of the upper edge of the side walls 18. The open face of the receptacle 12 serves as a main receptacle opening 21 for receiving waste. A receiving cup 22 is recessed behind an aperture 24 in the front side wall 18, and has a depth sufficient to receive a conventional padlock A (shown in Figure 2). It is within the scope of the invention for the receptacle to have other shapes, e.g. cylindrical.

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The lid 14 is pivotally mounted to the back lip 20 of the receptacle 12 by respective hinges (not shown) such that the lid 14 is pivotable between an opened position and a closed position. The lid 14 can be made from plastic or metal. When the lid 14 is in the closed position, it covers all of the receptacle opening 21. Alternatively the lid can cover most of the receptacle opening 21 and leave a narrow slot therebetween (not shown) that for example, is large

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enough to insert thin items like folded cardboard boxes into the receptacle 12 but too small to allow a person's hand to access the inside of the receptacle 12.

Referring to Figure 4, the receiving cup 22 is formed by welding together a pair of side plates 34, top plate 35, back plate 36, and bottom plate 37; the plates 34, 35, 36, and 37 define a padlock opening 39 in the side of the cup 22 that corresponds to the aperture 24 in the receptacle front side wall 18. The receiving cup 22 is welded to the inside of the front side wall 18 such that the padlock opening 39 cooperates with the aperture 24 to provide a recess in the front wall 18. The cup top plate 35 includes a receiving cup aperture 38 dimensioned to receive the lock arm 30 therethrough. Optionally, the top and bottom plates 35, 37 taper downwardly and upwardly respectively towards the back plate 36. The tapered top plate 35 serves to reduce the tendency for refuse to lodge against the receiving cup 22 when loading the receptacle 12, and similarly, the tapered bottom plate 37 serves to reduce the tendency for refuse to lodge against the receiving cup 22 when the receptacle 12 is emptied (and turned upside-down). The top and bottom plates 35, 37 also are effective in preventing contaminated drug needles from lodging in the receiving cup 22.

The lock arm 30 has a proximal lid engagement end that is welded to the bottom of the lid 14 in a position on the lid 14 that enables a distal end of the lock arm 30 to pass through the receiving cup aperture 38 when the lid 14 is closed. The lock arm 30 has an aperture 32 at its distal end that is dimensioned to receive a shackle of a conventional padlock A. When the lid is closed, the lock arm 30 is moved into a "locking position" wherein its distal end enters into the receptacle 12 and through the receiving cup aperture 38, and into the receiving cup 22. Enough of the distal end of the lock arm 30 protrudes through the receiving cup aperture 38 that the lock arm aperture 32 is located entirely in the receiving cup 22. The padlock A (not shown in Figure 5) can then be fastened to the lock arm 30 by threading its shackle through the lock arm aperture 32. Provided that the body of the padlock A is wider than the aperture 38, the lock

arm 30 is secured in this position. When secured in the locking position, the lock arm 30 prevents the lid 14 from being opened enough for a person to readily access the contents of the container 10. Furthermore, when in the locking position, the locking mechanism 16 is tamper-resistant, as most of the lock arm 30 is located inside the receptacle 12 and out of harm's way, and the padlock A is embedded within the receiving cup 22, making it difficult to reach the padlock shackle, e.g. with metal cutters. The width of the receiving cup 22 is selected to be slightly wider than the width of the padlock, thereby making it hard to use a tool to tamper with the padlock A. A particularly useful type of padlock for use with the locking mechanism is a circular shield-type padlock, which minimizes the exposure of the shackle.

The locking mechanism can be made with a hardened or tempered steel to provide with increased resistance to tampering. However, it is within the scope of the invention to select alternative materials of similar properties.

As mentioned above, the locking mechanism can be provided as a kit that is retrofitted onto an conventional waste container. In such case, the locking mechanism kit comprises the receiving cup 22 and the lock arm 30. When retrofitting the locking mechanism to a conventional container, the side wall aperture 24 will have to be cut in the front wall 18 at a location that corresponds to the suitable placement of the receiving cup 22.

When the lid is made of plastic or another material that does not allow the lock arm 30 to be welded to the lid, a metal reinforcement bar (not shown) is provided that extends across the top or bottom surface of the lid 14 and is bolted to the lid at multiple locations. Holes are drilled into the lid to receive such bolts. The lock arm 30 can thus be welded to the reinforcement bar such that it extends downwards into the receiving cup 22 when the lid is in a closed position.

According to another embodiment of the invention and referring to Figures 7(a) to 7(d), a lockable waste container 100 is provided that is similar to the embodiment described above, except that a receiving cup 122 is mounted to the outside front edge of a lid 114 of the container 100, which covers a lock arm 130 also mounted to the front edge of the lid 114 and extending downwards. A flange 132 is welded to a front side wall 118 of a receptacle 112 of the container 100, and is positioned on the front side wall 118 such that when the lid 114 is closed, the receiving cup 122 covers the flange 132 and the lock arm 130 is positioned in close proximity to the flange 132. Both the flange 132 and lock arm 130 are provided with an opening for receiving the shackle of a padlock (not shown); the openings align when the lid is in the closed position. The receiving cup 122 is large enough to receive the padlock and to allow a person to install and remove the padlock from the lock arm 130 and flange 132, but small enough to make it difficult for a cutting tools or a crowbar to be applied to the padlock. Optionally, a U-shaped rail 134 can be welded to the front side wall 118 such that it extends around the receiving cup 122, thereby serving to impede efforts to dislodge the receiving cup 122 from the container.

While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the scope and spirit of the invention. For example, the container can be provided with a pair of side-by-side lids in which case a pair of locking mechanisms are provided, one for each lid. The lock arm for each mechanism can be attached to the bottom of a respective lid as described above, or to the inside edge of the lid (the edge facing the adjacent lid) such that the lock arm extends downwards when the lid is closed. A hole can be provided in each locking mechanism such that when the lids are both closed, the holes line up and allow a bolt to slide therethrough thereby connecting the two locking mechanism, and the lids together. Instead of a bolt-and-hole connector, other connectors as known in art can be used to connect the two locking mechanisms together.